

WHAT IS CLAIMED IS:

1. A phase-change optical recording medium,  
comprising:

5 a phase-change optical recording film that permits  
reversible phase change between a crystalline phase and  
an amorphous phase upon irradiation with light; and

an interface film formed of hafnium oxide, or a  
mixture of hafnium oxide and at least one oxide  
selected from the group consisting of cerium oxide,  
10 titanium oxide and zirconium oxide, and formed in  
contact with at least one surface of the phase-change  
optical recording film.

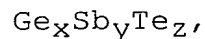
2. The phase-change optical recording medium  
according to claim 1, wherein the interface film  
15 comprises a lower interface film in contact with a  
lower surface of the phase-change optical recording  
film and an upper interface film in contact with an  
upper surface of the phase-change optical recording  
film.

20 3. The phase-change optical recording medium  
according to claim 2, further comprising a first  
interference film formed on a transparent substrate; a  
second interference film; and a reflection film formed  
on the second interference film, wherein the lower  
25 interface film is formed on the first interference film  
and the second interference film is formed on the upper  
interface film.

4. The phase-change optical recording medium according to claim 2, further comprising an interference film formed on the upper interface film; and a reflection film formed on the interference film, wherein the lower interface film is formed on a transparent substrate.

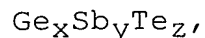
5. The phase-change optical recording medium according to claim 2, further comprising a reflection film, wherein the lower interface film is formed on a transparent substrate and the reflection film is formed on the upper interface film.

6. The phase-change optical recording medium according to claim 1, wherein the phase-change optical recording film is represented by the general formula:



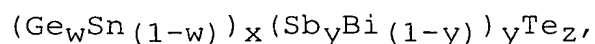
where  $x+y+z = 100$ , and a composition thereof falls within a range defined by  $x = 55$  and  $z = 45$ ;  $x = 45$  and  $z = 55$ ;  $x = 20$ ,  $y = 20$  and  $z = 60$ ; and  $x = 20$ ,  $y = 28$  and  $z = 52$  in the GeSbTe ternary phase diagram.

7. The phase-change optical recording medium according to claim 6, wherein the phase-change optical recording film is represented by the general formula:



where  $x+y+z = 100$ , and a composition thereof falls within a range defined by  $x = 55$  and  $z = 45$ ;  $x = 45$  and  $z = 55$ ;  $x = 25$ ,  $y = 16$  and  $z = 59$ ; and  $x = 25$ ,  $y = 24$  and  $z = 51$  in the GeSbTe ternary phase diagram.

8. The phase-change optical recording medium according to claim 6, wherein the phase-change optical recording film is represented by the general formula in which at least one of Bi and Sn is partly substituted  
5 for a constituent element of the phase-change optical recording film:



where  $x+y+z = 100$ ,  $0 \leq w < 0.5$ , and  $0 \leq v < 0.7$ .

9. A phase-change optical recording medium,  
10 comprising:

a semi-transparent, first information layer comprising a phase-change optical recording film, an interface film comprising at least one oxide selected from the group consisting of hafnium oxide and cerium  
15 oxide and formed in contact with at least one surface of the phase-change optical recording film, a semi-transparent reflection film, and a heat sink film;

a second information layer; and

a resin layer formed between the first information  
20 layer and the second information layer,

in which heat conductivity of the heat sink film is at least 0.7 times as high as that of the interface film and not higher than 100 W/mK.

10. The phase-change optical recording medium  
25 according to claim 9, wherein a difference between a refractive index of the heat sink film and that of the resin layer is 0.5 or less.

11. The phase-change optical recording medium according to claim 9, wherein the interface film is formed of hafnium oxide, and the heat sink film is formed of aluminum oxide.

5        12. The phase-change optical recording medium according to claim 9, wherein the interface film comprises a lower interface film in contact with a lower surface of the phase-change optical recording film and an upper interface film in contact with  
10 an upper surface of the phase-change optical recording film.

13. The phase-change optical recording medium according to claim 12, further comprising a first interference film formed on a transparent substrate;  
15 and a second interference film, wherein the lower interface film is formed on the first interference film and the second interference film is formed on the upper interface film.

14. The phase-change optical recording medium  
20 according to claim 9, wherein the interface film comprises an upper interface film in contact with an upper surface of the phase-change optical recording film.

15. The phase-change optical recording medium  
25 according to claim 14, further comprising a first interference film formed on a transparent substrate; and a second interference film, wherein the

phase-change optical recording film is formed on the first interference film and the second interference film is formed on the upper interface film.

16. The phase-change optical recording medium  
5 according to claim 14, further comprising a first interference film formed on a transparent substrate, wherein the phase-change optical recording film is formed on the first interference film and the semi-transparent reflection film is formed on the upper  
10 interface film.

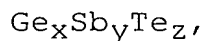
17. The phase-change optical recording medium according to claim 9, wherein the second information layer has a structure in which a reflection film, a second interference film, a phase-change optical  
15 recording film, and a first interference film are formed on a second transparent substrate.

18. The phase-change optical recording medium according to claim 9, wherein the phase-change optical recording film is represented by the general formula:



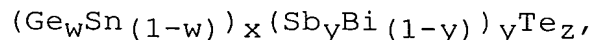
where  $x+y+z = 100$ , and a composition thereof falls within a range defined by  $x = 55$  and  $z = 45$ ;  $x = 45$  and  $z = 55$ ;  $x = 20$ ,  $y = 20$  and  $z = 60$ ; and  $x = 20$ ,  $y = 28$  and  $z = 52$  in the GeSbTe ternary phase diagram.

25 19. The phase-change optical recording medium according to claim 18, wherein the phase-change optical recording film is represented by the general formula:



where  $x+y+z = 100$ , and a composition thereof falls within a range defined by  $x = 55$  and  $z = 45$ ;  $x = 45$  and  $z = 55$ ;  $x = 25$ ,  $y = 16$  and  $z = 59$ ; and  $x = 25$ ,  $y = 24$  and  $z = 51$  in the GeSbTe ternary phase diagram.

20. The phase-change optical recording medium according to claim 18, wherein the phase-change optical recording film is represented by the general formula in which at least one of Bi and Sn is partly substituted for a constituent element of the phase-change optical recording film:



where  $x+y+z = 100$ ,  $0 \leq w < 0.5$ , and  $0 \leq v < 0.7$ .

21. The phase-change optical recording medium according to claim 9, wherein the interface film further comprises 50 mol% or less of at least one component selected from the group consisting of AlN,  $\text{Al}_2\text{O}_3$ ,  $\text{SiO}_2$ , SiO, Si-O-N, Si-N, Al-O-N, Si-C,  $\text{TiO}_2$ , Ta-N,  $\text{Ta}_2\text{O}_5$ , Ta-O-N, Zn-O, ZnS,  $\text{ZrO}_2$ , Zr-O-N, Zr-N, Cr-O, Mo-O, W-O, V-O, Nb-O, Ta-O, In-O, Cu-O, Sn-O and In-Sn-O.